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VII.—*Extract of a Letter from Captain Fitz Roy, of H. M. Sloop Beagle, on the subject of the Abrolhos Bank. Communicated by Capt. Beaufort, R.N., F.R.S.*

Rio de Janeiro, 10th April, 1832.

‘ ON the 18th of March we sailed from Bahia, and worked our way slowly towards the eastern limit of the Abrolhos banks. The winds, being light and easterly, favoured our sounding frequently, and taking good observations.

‘ Having reached the parallel of the islands, to the eastward of the easternmost soundings laid down in the charts, and finding no ground with three hundred fathoms of line, I began to steer westward, sounding continually, and keeping a sharp look out at the mast head. At two P.M., on the 26th, we had no bottom with two hundred and thirty fathoms, and at four P.M. we found only thirty fathoms, without the slightest change either in the colour of the water or in its temperature, or any indication of so sudden a change in its depth.

‘ I directly hauled to the wind and worked back again to the eastward, to have another opportunity of confirming the place of the edge of the bank. We lost soundings as suddenly as we found them; and in standing to the westward a second time, with a grapnel towing astern by two hundred fathoms of line, we hooked the rocky bottom and straightened the grapnel; but my object in ascertaining the exact beginning of the bank was gained.

‘ From that spot we had soundings in less than forty fathoms, until we anchored near the Abrolhos islands.

‘ I passed to the southward and eastward of them, because that side had not been examined, but time would not allow of my doing what I wished while so favourable an opportunity offered.

‘ At least a fortnight would be necessary to complete the survey of Baron Roussin, which appears, so far as we have examined, to be extremely correct. The soundings are so irregular that little dependence can be placed on the lead. It is only by a multitude of soundings, by watching the sea when there is much swell, and traversing every part with a sharp look out at the mast head, that the neighbourhood of the Abrolhos, particularly to the south-east, can be thoroughly examined.

‘ More than once we had four or five fathoms under one side of the vessel and from fifteen to twenty under the other side. The *sauts de sonde*, as the French express it, are surprising.

‘ The tide, or rather current, which we experienced, set continually to the southward for the three days that we were near these islands, varying from half a mile to a mile and a half an hour.

‘ I supposed that the bottom was chiefly composed of coral

rock, but was surprised to find no coral excepting small fragments growing on the solid rock, which is chiefly gneiss and sandstone. As most of the charts say "*coral rock*," I have sent a few of the soundings for your inspection, and you will see by them that what has here been called coral is the coating of a solid rock formed by the deposit of the sea-water, mixed with coralline substances and what a sailor generally calls "barnacles."

'My meridian distance of the Abrolhos rocks from *Bahia*, their latitude, and their size, agree precisely with those given in the French survey. But between *Bahia* and Rio de Janeiro, and consequently between the Abrolhos and Rio de Janeiro, there exists a difference of from four to five miles between us, this being the only point on which I have found any such difference either on this or on the *Beagle's* former voyage.'

Having made both passages, I venture to observe, that going within the Abrolhos certainly shortens that between Rio and *Bahia* very much; but yet I should not recommend it to any vessel unless she has reason to make unusual haste. The soundings are very irregular, varying suddenly from twenty to six fathoms; and there are both reefs and currents.

#### VIII.—*Communication between the Ganges and Hooghly, &c.* Communicated by Lieut. J. H. Johnston, R.N.

THE Nuddeah rivers, which connect the Ganges with the Hooghly, are, during eight months in the year, so extremely shallow as not to admit of a passage being effected by them between the rivers; and the water communication between Calcutta and the upper country is consequently maintained during that time by the Sunderbund passages, at a great expense of time and labour. A plan has, therefore, been lately proposed by Major Forbes, of the Bengal Engineers, and is now under consideration in India, for constructing a canal, which, branching off from the Ganges at Rajamahl, shall join the Hooghly at Mirzapore, near Kulna. And the object being approved by the Governor-General, the requisite surveys and estimates are now making to ascertain the expediency, otherwise, of carrying the scheme into effect.

The great difficulties arise—1. from the difference of level (sixty feet) between the Ganges and Hooghly at the points in question, which, with the friable nature of the intervening country, makes an open cut inexpedient:—2. from the difference in the level of the Ganges at different seasons, amounting to not less than thirty feet;—and, 3. from the number of hill-streams which intersect the line. To overcome them it is proposed to cut the bed of the canal at Rajamahl six feet below the lowest level of the river, providing